East Arapahoe Transportation Plan

Community Working Group Meeting #2

June 15, 2016

NELSON NYGAARD

FOX TUTTLE HERNANDEZ TRANSPORTATION GROUP

FEHR PEERS

Meeting Agenda

- Welcome; Purpose & Goals Discussion
- Complete Corridor Elements & State of the Practice
  - Motor Vehicles & Freight
  - Bicycle, Pedestrian, & Streetscape
  - Transit & Transportation Demand Management
- Working Groups – Corridor Design and Management Elements
- Corridor Elements Screening Approach
- Meeting Recap and Next Steps

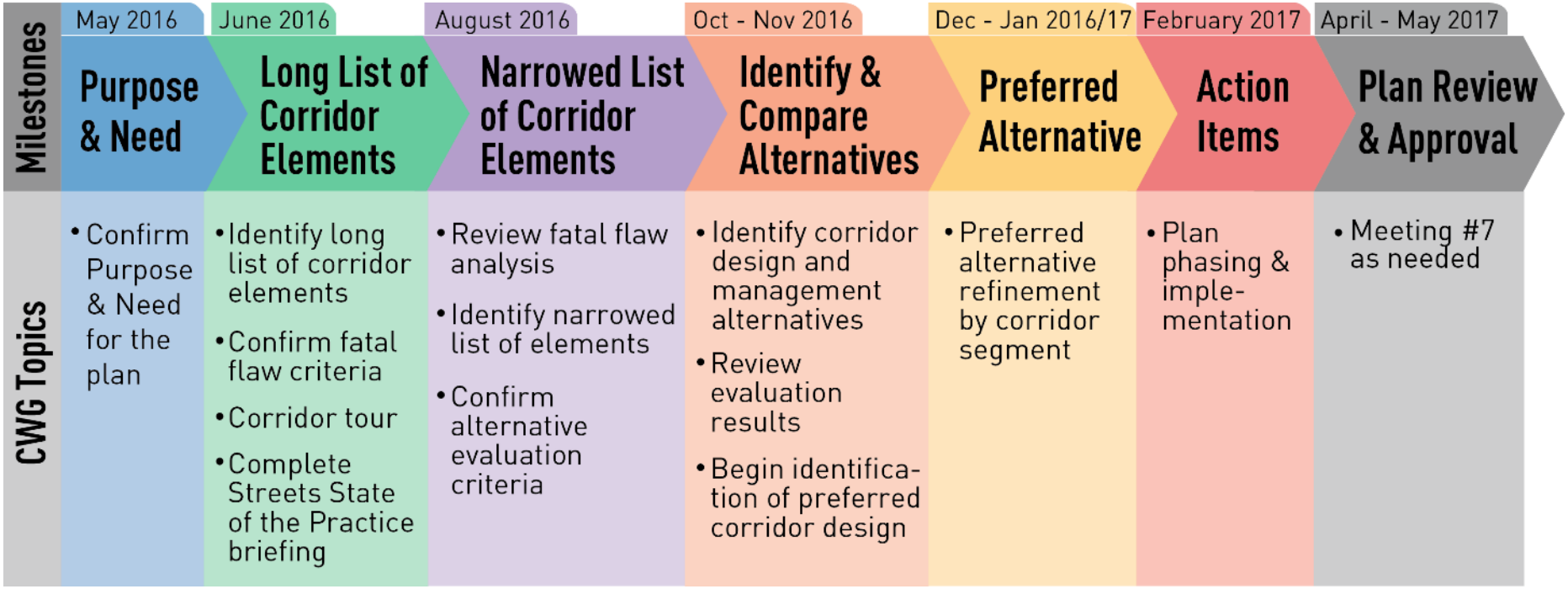
Revised Purpose & Goals

- **Reformatted Purpose & Need Statements:**
  - **Plan Purpose**
    - **Goals**
      - **Objectives**
        - » **Related needs described in greater detail**

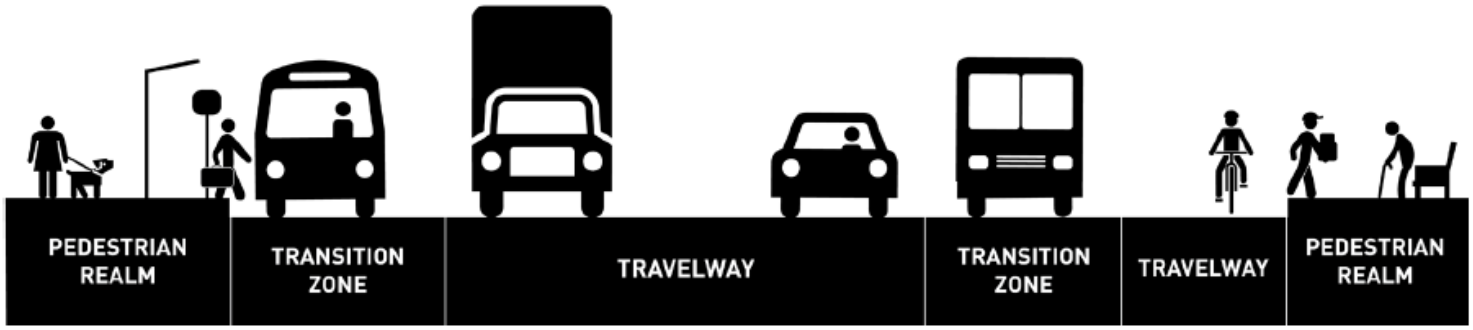
Example

- **Goal 1. Provide Complete Streets in the East Arapahoe corridor that offer people a variety of safe and reliable travel choices.**
  - **Objective 1.b. Improve the ease of access and comfort for people walking in the East Arapahoe corridor.**
    - **Insufficient Crosswalk Spacing**
    - **Gaps in the Sidewalk & Multi-Use Path Network**
    - **Proximity of Vehicles to Pedestrians**
    - **Lack of a "Sense of Place"**

Project Schedule



Right of Way Zones



PEDESTRIAN REALM

Comprised of a frontage, pedestrian mobility, and furniture zone between the property line and the transition or travelway zones. This spaces includes the sidewalk, planting areas, bus shelters, sidewalk cafes, and bike racks.

TRAVELWAY

Most often used for mobility purposes. Lanes can serve all modes (general purpose) or be dedicated to serve specific modes, such as a bus or bike lane.

TRANSITION ZONE

An essential zone for people and goods, providing separation between moving vehicles in the travelway and people in the pedestrian zone. This zone can contain multiple uses along a street - including commercial deliveries, parklets, on-street parking, and taxi zones. It can be used for mobility at specific times of the day and for other things at other times.

What is the ROW for?

ACCESS FOR COMMERCE

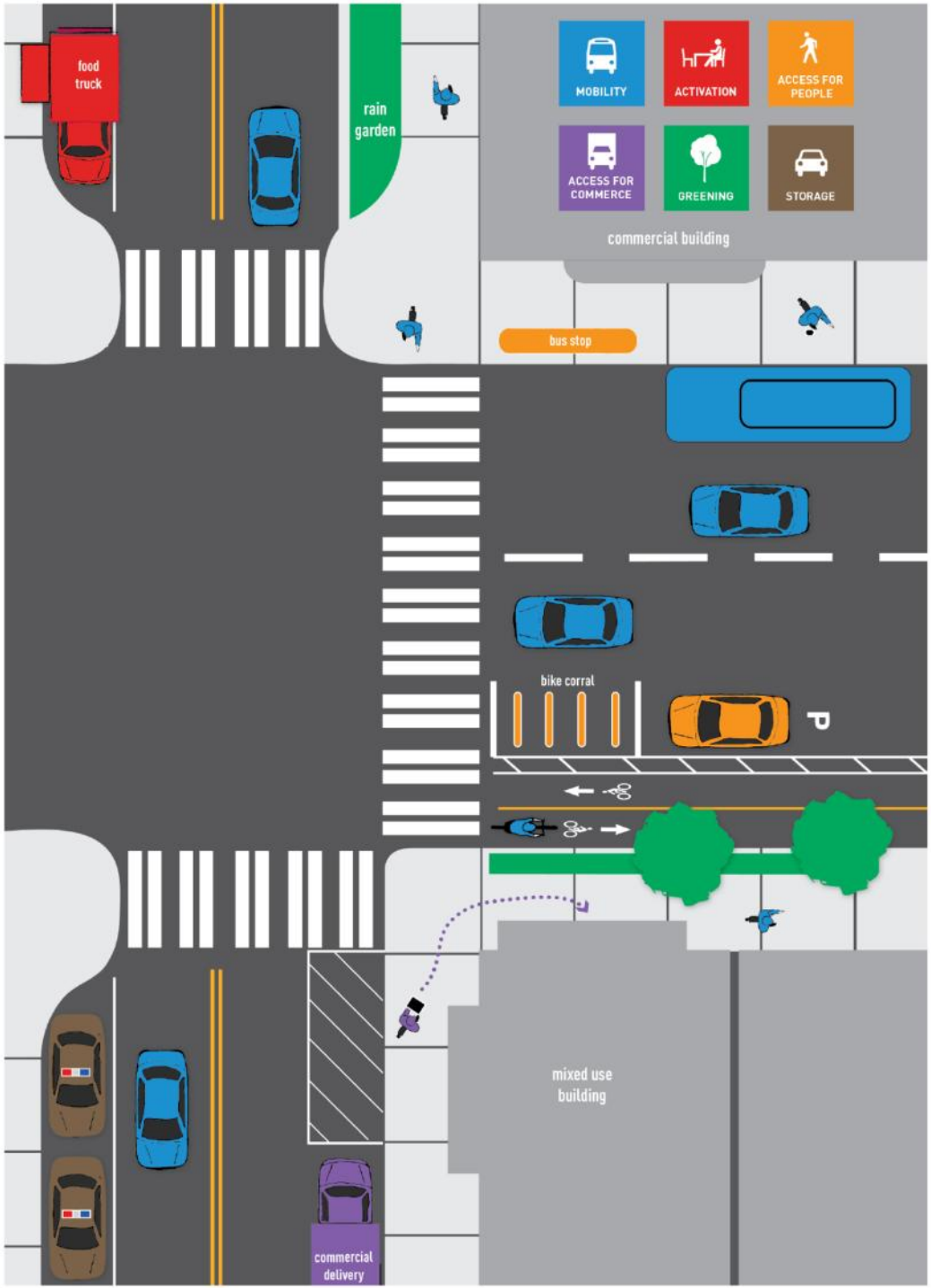
ACCESS FOR PEOPLE

ACTIVATION

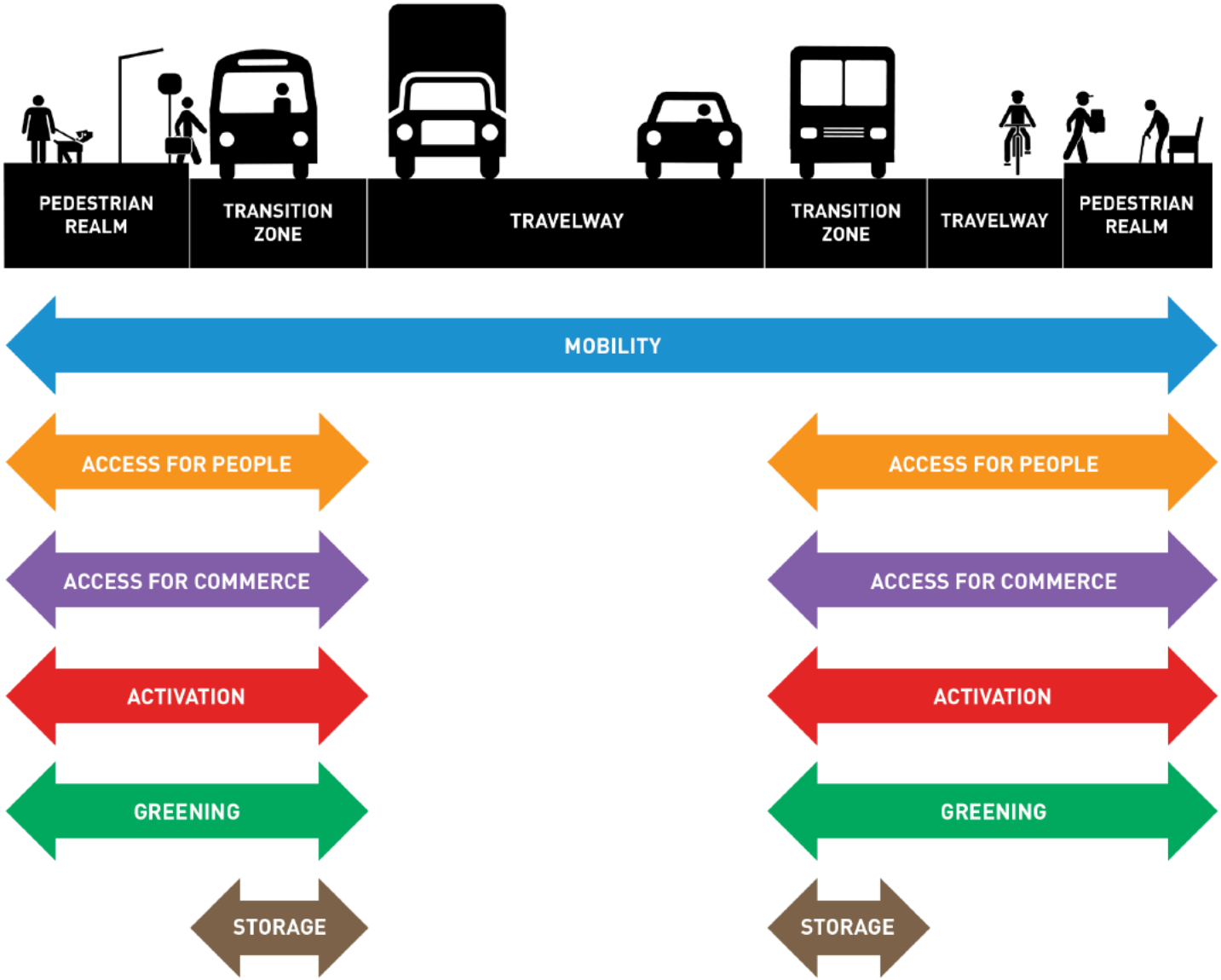
GREENING

MOBILITY

STORAGE

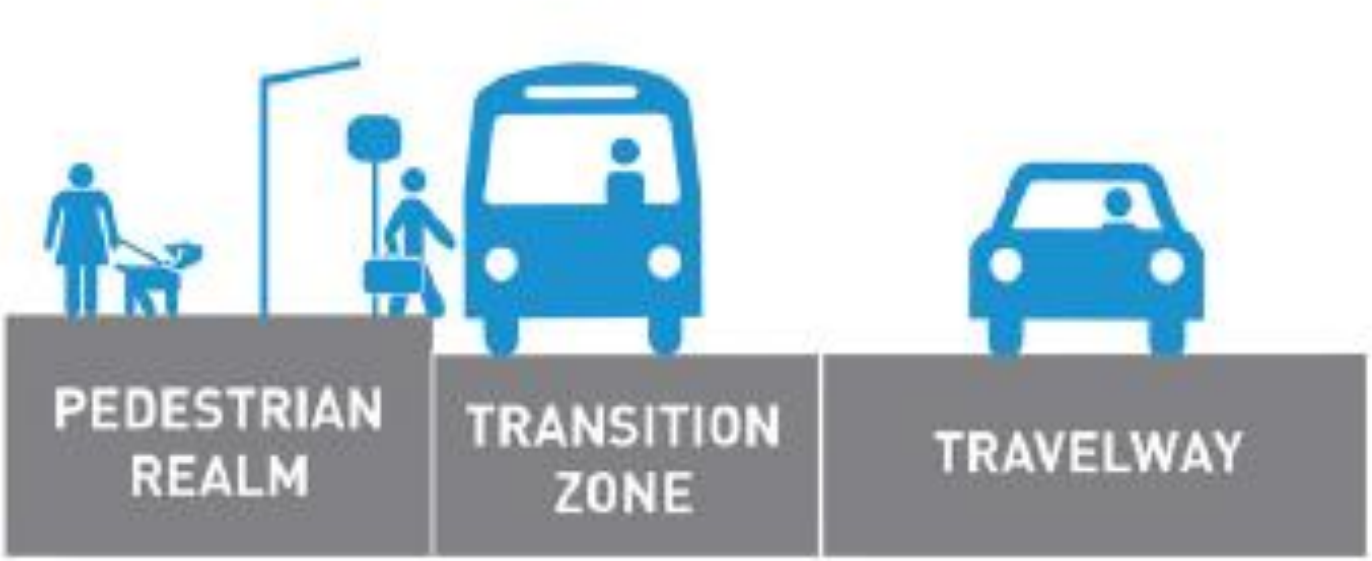


How Do We Use the Zones?

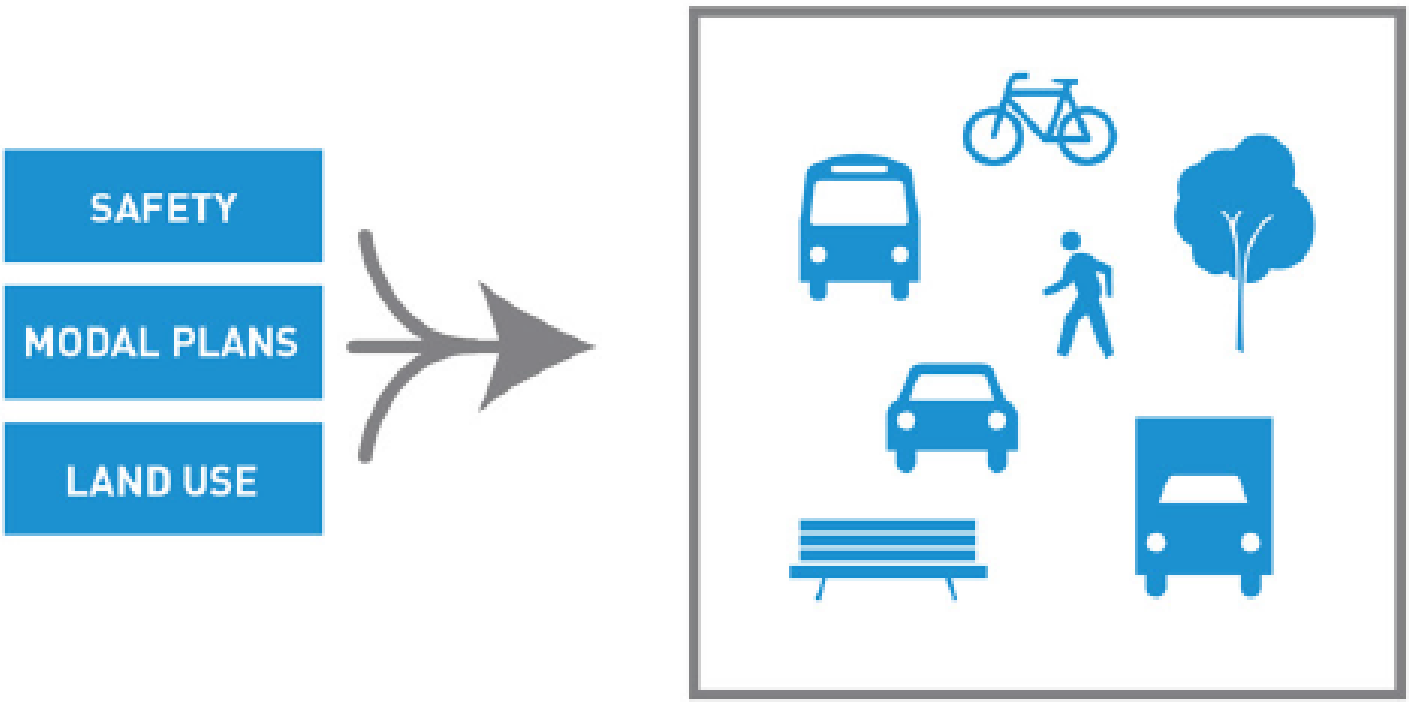


Priorities Depend on Land Use & Regional Function

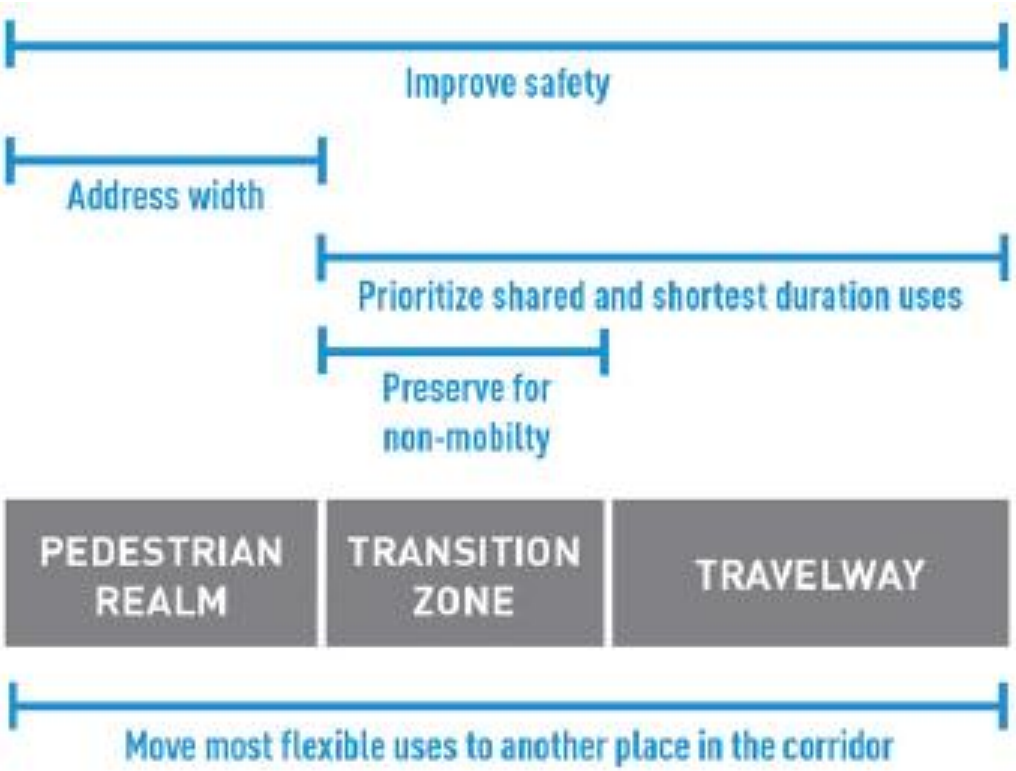
Consider the Needs of the 3 Zones



Establish the Priorities in Each Zone



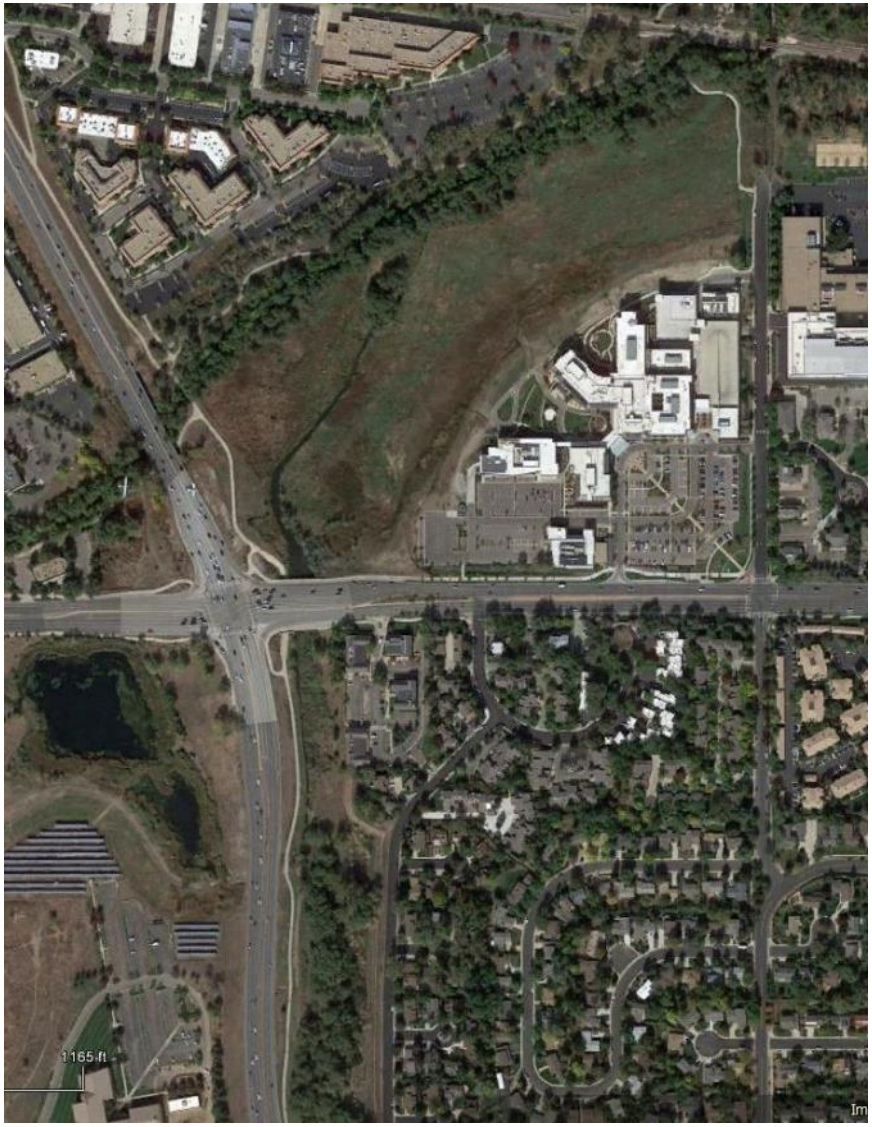
Integrate the Priorities



Create Multifunctional Streets and Corridors

VEHICLES AND FREIGHT

Design must accommodate:



- Automobiles
- Motorcycles
- Trucks
- Other Service Vehicles
- Police
- Fire
- Ambulance
- Safety for all

Distinct character differences

East Arapahoe
Existing Conditions

Existing Conditions

- 14 Signalized Intersections
- The 4 largest tend to control traffic flow (28th, 30th, Foothills, 55th)
- Daily traffic: 25,000 to 35,000+ vehicles per day depending on location

Existing Conditions

- **Roadway cross-section varies significantly**
  - **Folsom to 28th: 5 through lanes**
  - **28th to 55th: 6 through lanes**
  - **55th to 63rd: 5 through lanes**
  - **63rd to 65th: 2 through lanes plus bus lanes**
  - **65th to 75th: 2 through lanes**

- **Many improvements have been made to date**

Existing Conditions / Improvements

- Bus queue jump lane at 28th St.

Existing Conditions / Improvements

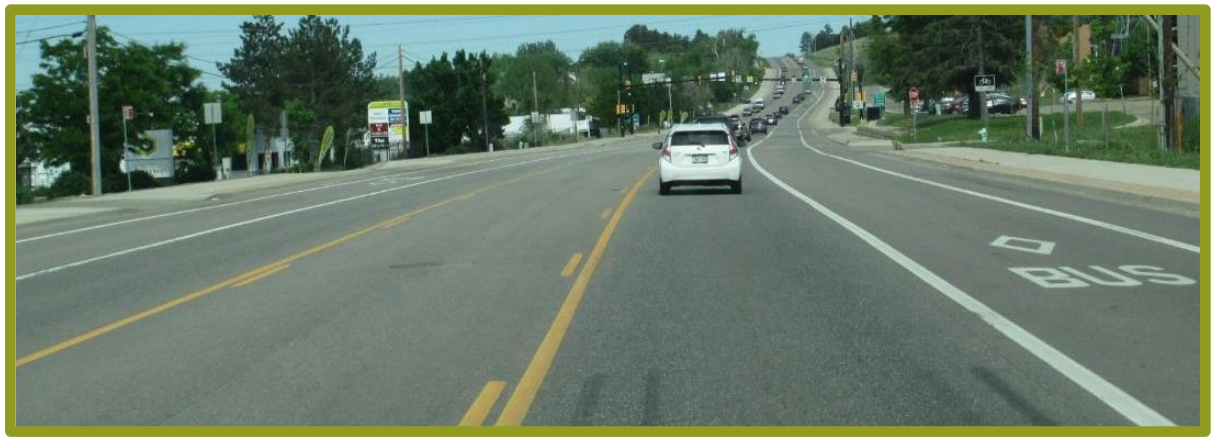
- Additional eastbound through lane and multiuse paths at 28th Street and 30th Street

Existing Conditions / Improvements

- **Intersection reconstruction with additional turn lanes and bus queue jump lanes at Foothills**

Existing Conditions / Improvements

- Center turn lane, bus lanes, bike lanes, and multiuse paths east of 63rd Street



Existing Conditions / Improvements

- Access Control – primarily with center medians to date
- Transit Vehicle Priority at signalized intersections

Evaluating Existing and Projected Traffic Conditions

- Detailed Analysis
- Using all models and tools available

Evaluating Existing and Projected Conditions

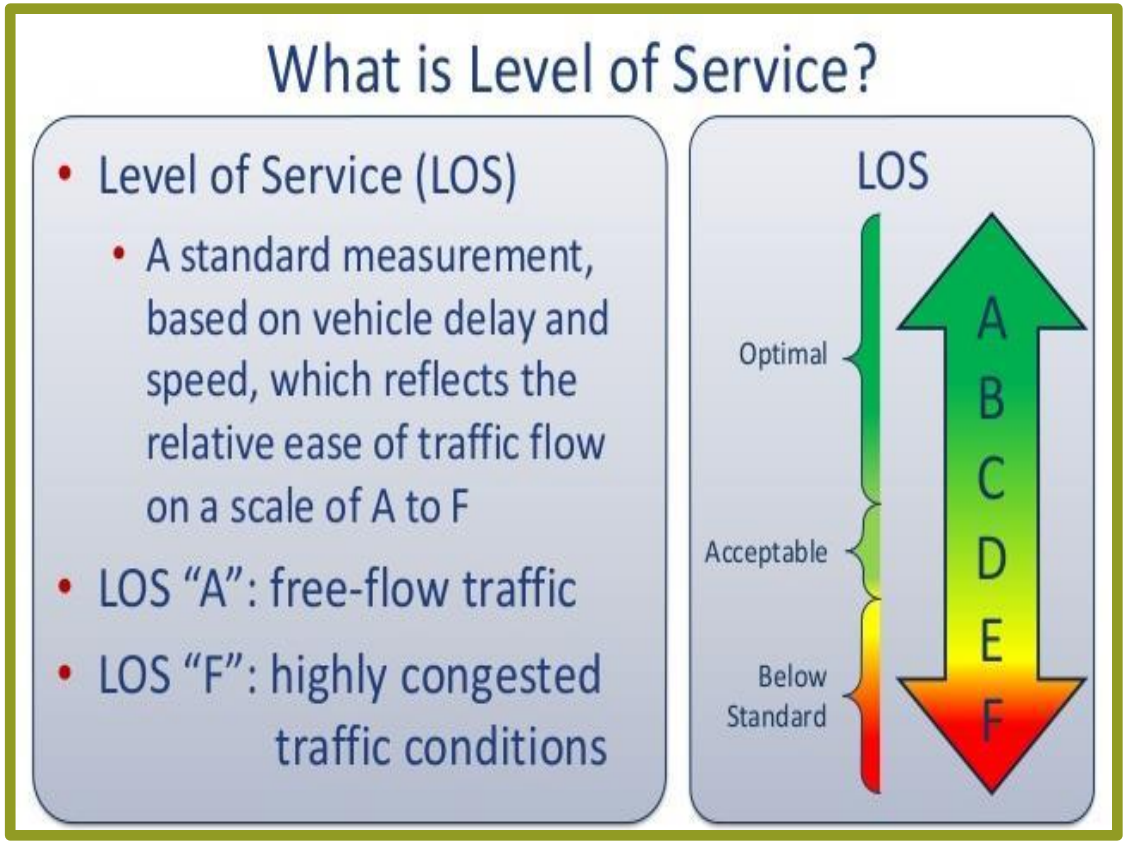
- Continue on-going detailed safety monitoring and crash mitigation
- Safety is a cornerstone of any corridor enhancement

Figure 3-37 Crashes at Intersections by Type, 2012-2014 (Map)

Evaluating Existing and Projected Conditions

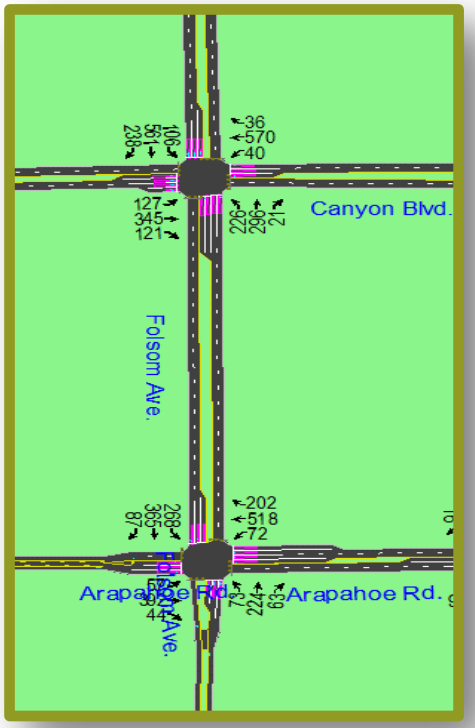
- **Highway Capacity Software**
- **Synchro Model**

- **Level-of-Service**
- **Delay**
- **Vehicle Queuing**



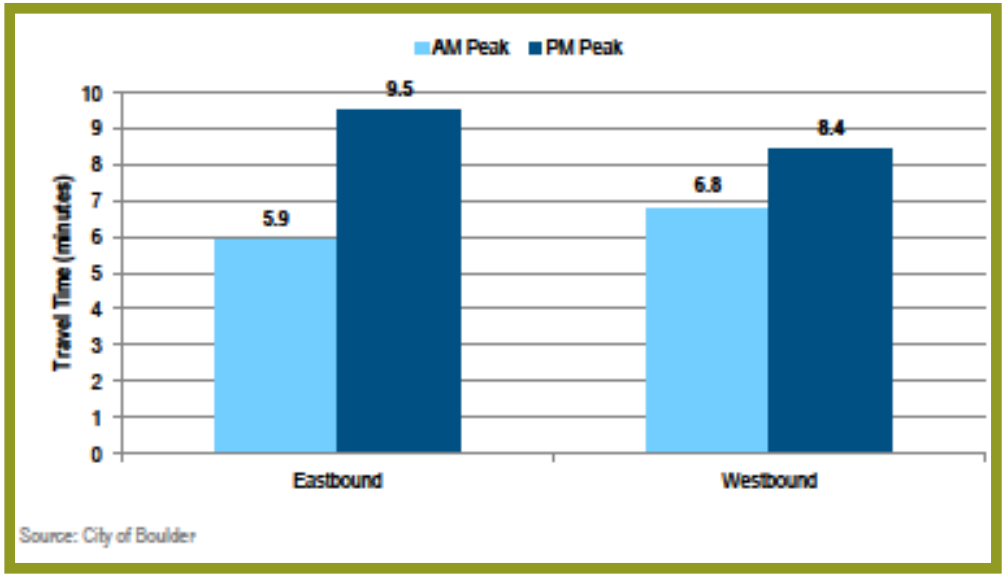
Evaluating Existing and Projected Conditions

- **Simtraffic Model (macroscopic)**
  - Traffic Simulations
  - Watch vehicles move and interact
- **VISSIM Model (microscopic)**
  - Very detailed, data intensive



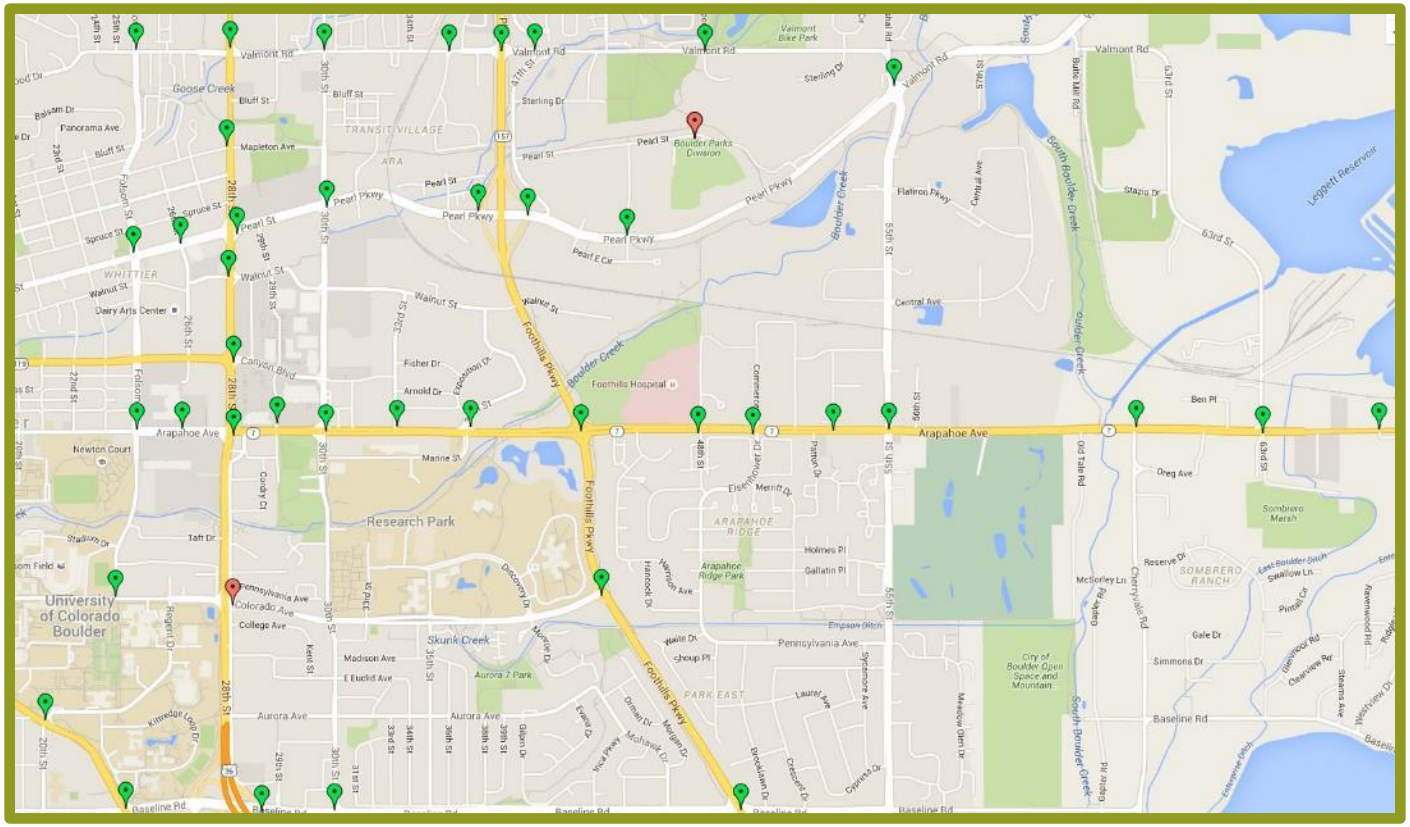
Evaluating Existing and Projected Conditions

- Continue monitoring corridor travel time

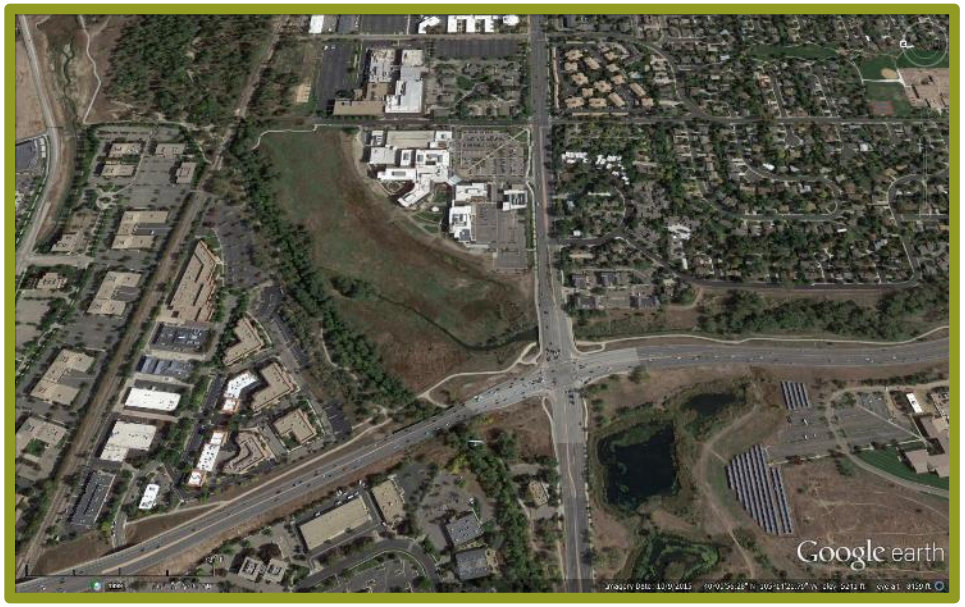


Evaluating Existing and Projected Conditions

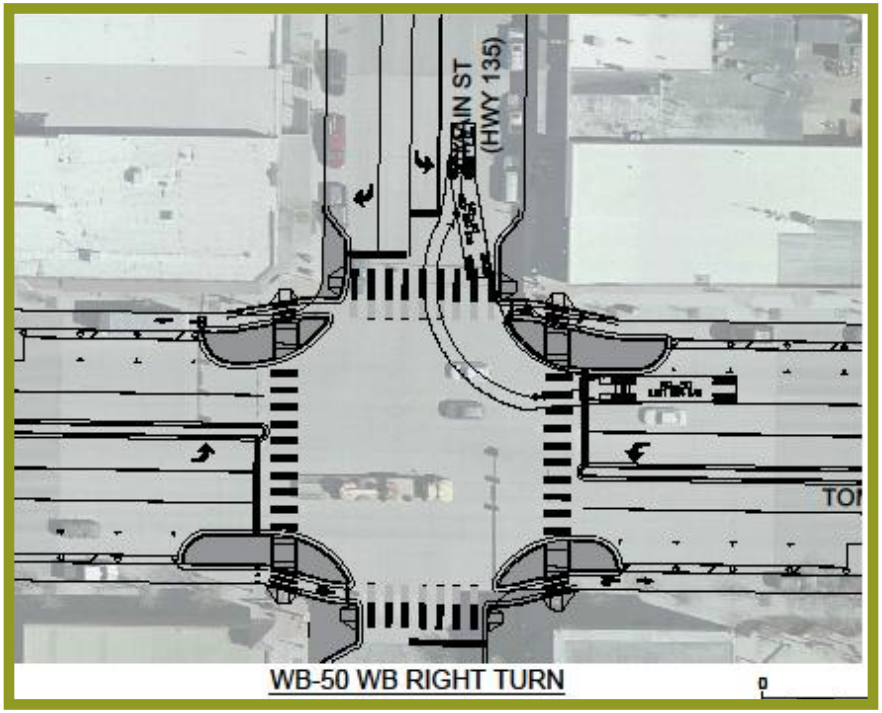
- **Explore Travel Time, Traffic Routing and "Cut-through" using Acyclica Readers**



Evaluating Existing and Projected Conditions



- Accommodating Emergency Access
- Accommodating Freight Access

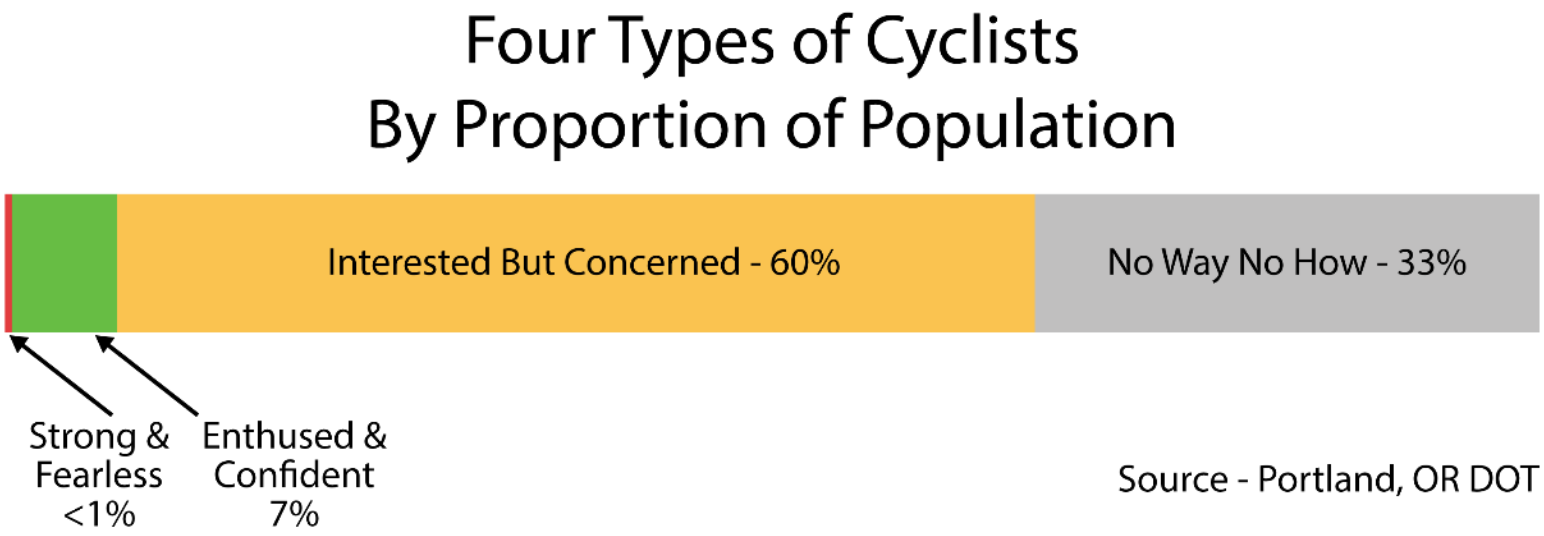


Evaluating Existing and Projected Conditions

- **Predicting the Future**
  - DRCOG 2040 Regional Travel Model
  - CDOT 20-year traffic growth rates
  - Local traffic growth rates and historic trends
  - Off-model sensitivity tools

PEDESTRIANS, BICYCLING, AND STREETSCAPE

Towards Whom Do We Design?



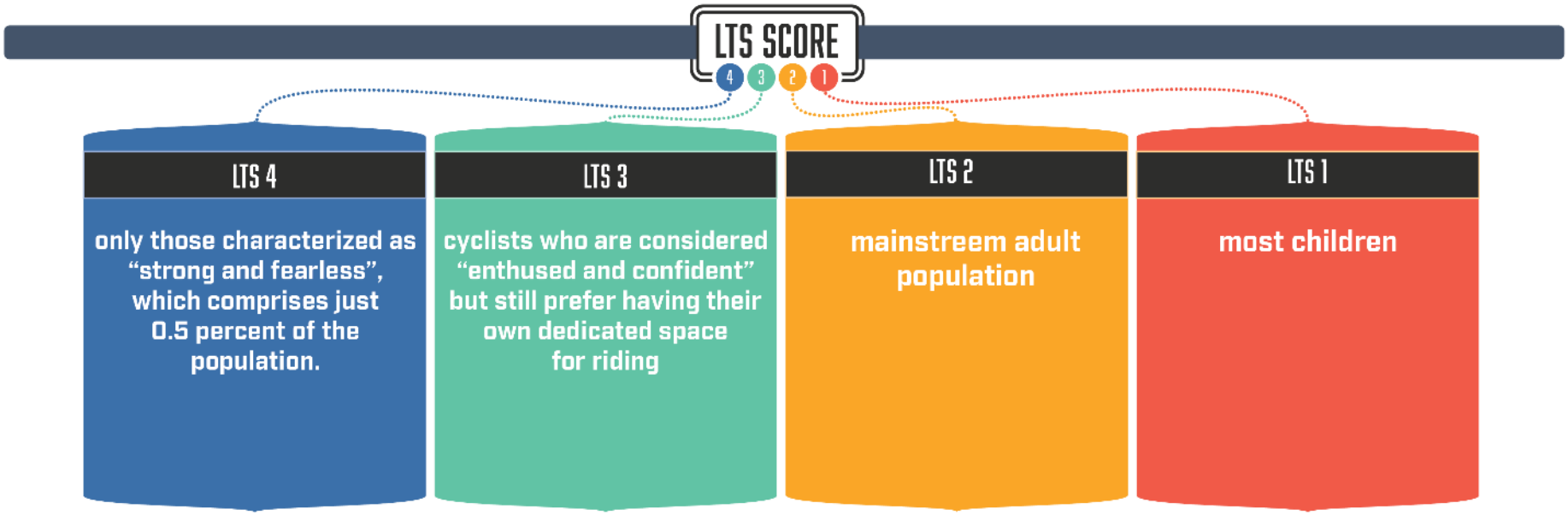
Towards Whom Do We Design?

Type	Description	City of Portland	Rest of region	All	Geller's estimate for City
Strong & Fearless	Very comfortable without bike lanes	6%	2%	4%	<1%
Enthused & Confident	Very comfortable with bike lanes	9%	9%	9%	7%
Interested but Concerned	Not very comfortable, interested in biking more Not very comfortable, currently cycling for transportation but not interested in biking more	60%	53%	56%	60%
No Way No How	Physically unable Very uncomfortable on paths Not very comfortable, not interested, not currently cycling for transportation	25%	37%	31%	33%
n (weighted)		436	479	915	

Note: Weighted data, may not total 100% due to rounding.

What Do We Measure?

- Comfort, as indicated by “Level of Traffic Stress” or LTS



High-Stress versus Low-Stress

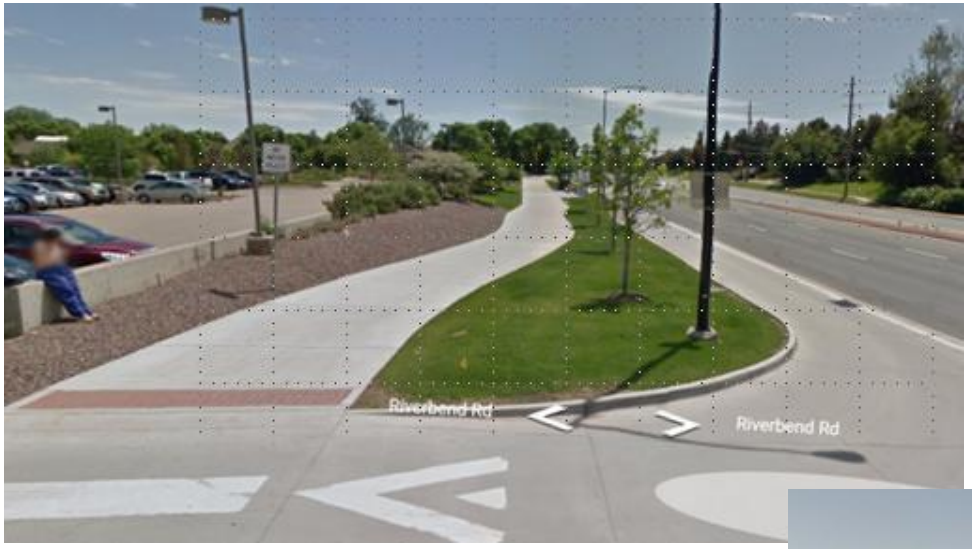
- For bicyclists

High-Stress versus Low-Stress

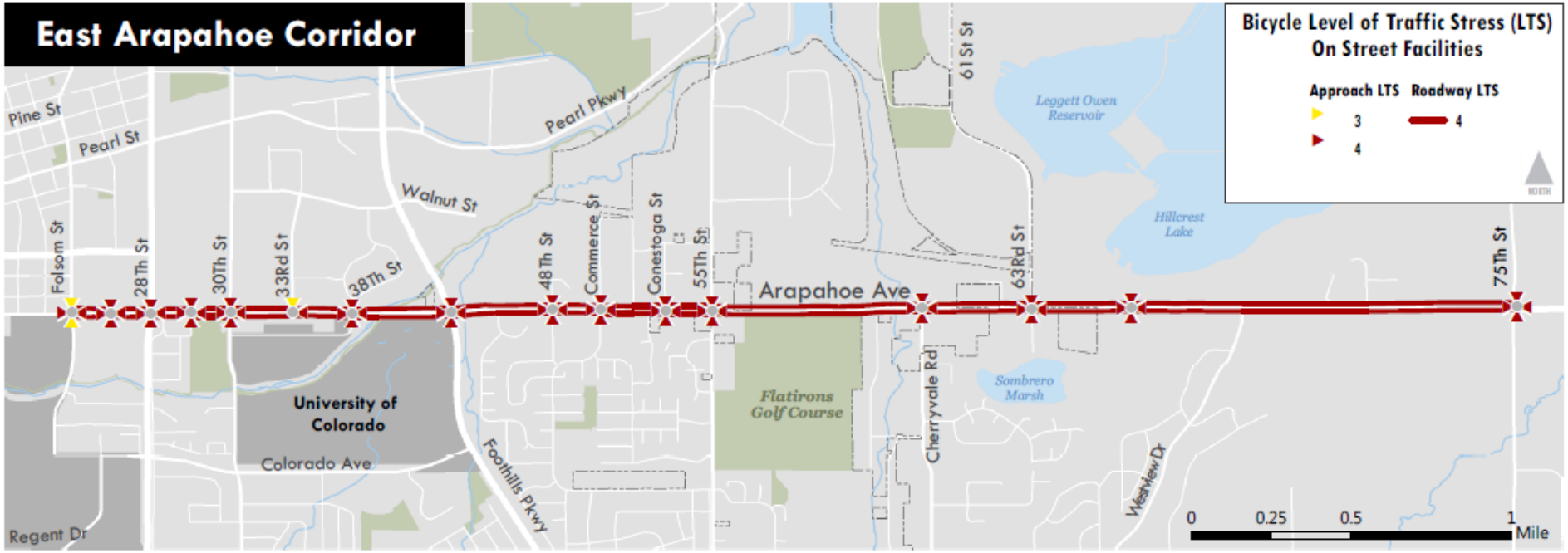
- For pedestrians

Existing Conditions for Pedestrians

Existing Conditions for Bicyclists (Off-Street)



Existing Conditions for Bicyclists (On-Street)


East Arapahoe Corridor
Bicycle Level of Traffic Stress (LTS)
On Street Facilities
Approach LTS
Roadway LTS
3
4
4
Pine St
Pearl St
Pearl Pkwy
Walnut St
61 St St
Leggett Owen Reservoir
Hillcrest Lake
Folsom St
28Th St
30Th St
33Rd St
38Th St
48 Th St
Commerce St
Conestoga St
55Th St
Arapahoe Ave
63Rd St
75Th St
University of Colorado
Colorado Ave
Flatirons Golf Course
Cherryvale Rd
Sombrero Marsh
Foothills Pkwy
Westview Dr
Regent Dr
0
0.25
0.5
1
Mile


East Arapahoe Corridor
Bicycle Level of Traffic Stress (LTS)
Off Street Facilities
Approach LTS
Roadway LTS
2
3
4
1
2
3
4
Pine St
Pearl St
Pearl Pkwy
Walnut St
61 St St
Leggett Owen Reservoir
Hillcrest Lake
Folsom St
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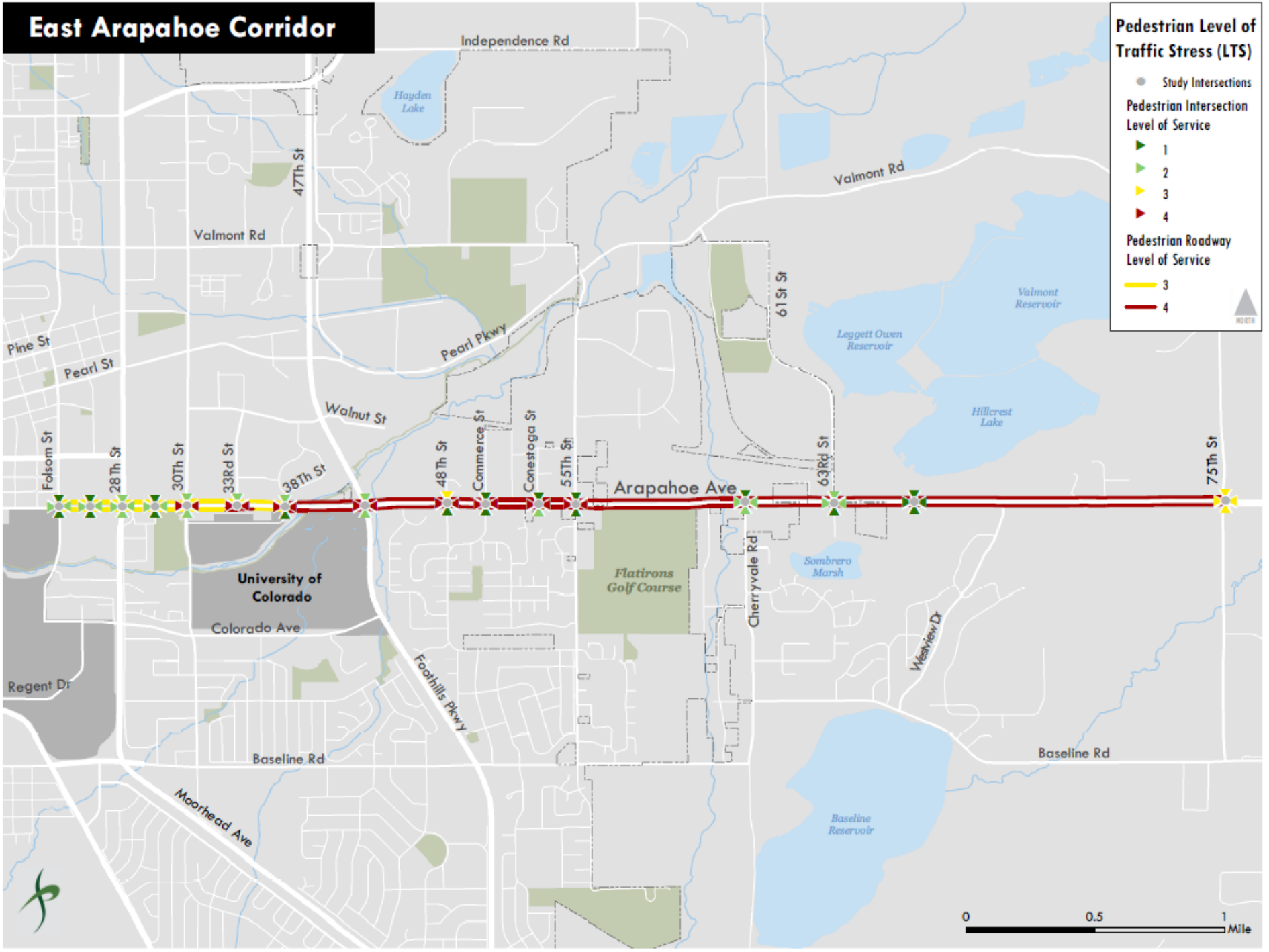
0
0.25
0.5
1
Mile


East Arapahoe Corridor
Pedestrian Level of Traffic Stress (LTS)
Study Intersections
Pedestrian Intersection Level of Service
1
2
3
4
Pedestrian Roadway Level of Service
3
4
Independence Rd
Hayden Lake
47Th St
Valmont Rd
Valmont Rd
61 St St
Valmont Reservoir
Leggett Owen Reservoir
Hillcrest Lake
Pine St
Pearl St
Pearl Pkwy
Walnut St
Folsom St
28Th St
30Th St
33Rd St
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Commerce St
Conestoga St
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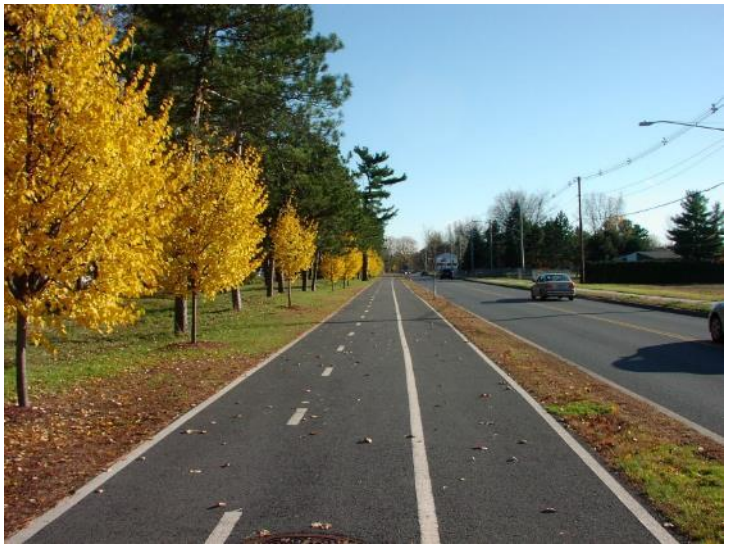
University of Colorado
Colorado Ave
Flatirons Golf Course
Sombrero Marsh
Cherryvale Rd
Westview Dr
Regent Dr
Foothills Pkwy
Baseline Rd
Baseline Rd
Moorhead Ave
Baseline Reservoir
0
0.5
1
Mile

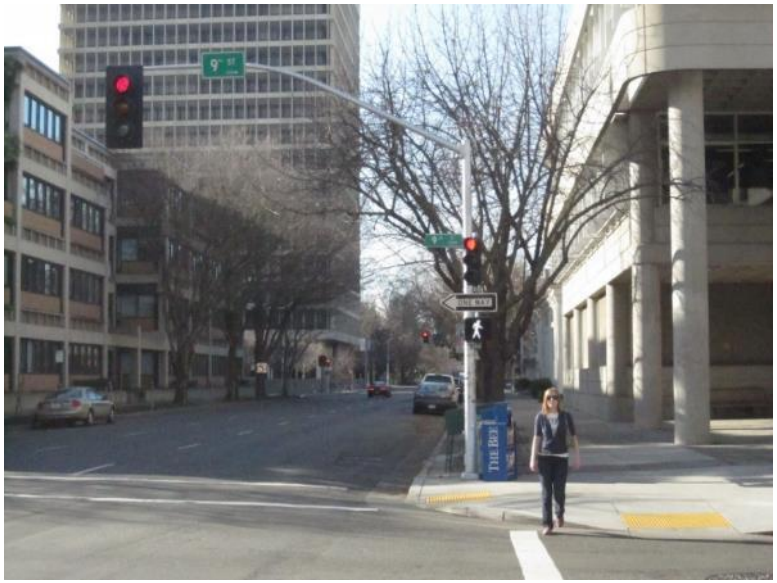
Best Practices for Bicyclists

Best Practices for Pedestrians

Potential Design Elements for Bicyclists



Potential Design Elements for Pedestrians

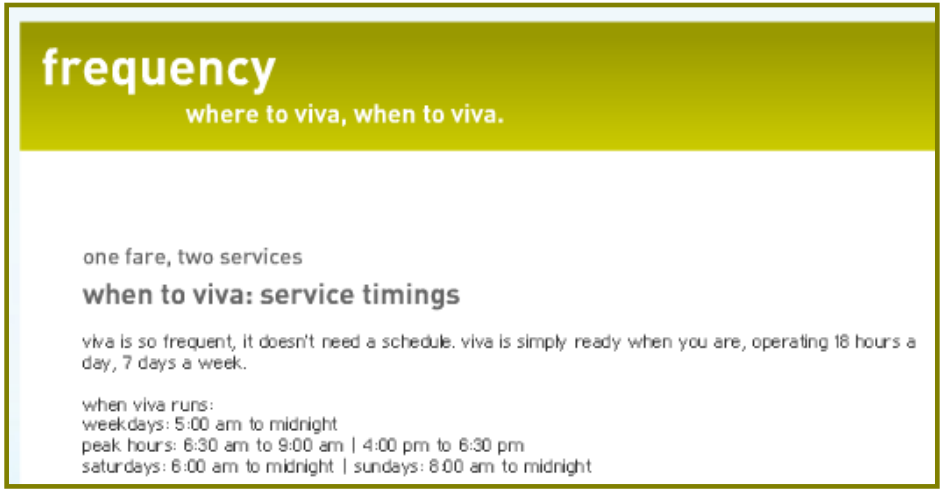


TRANSIT CORRIDOR PLANNING AND DESIGN ELEMENTS

Corridor Transit

What is a “Mode”?

- More than the vehicle…
  - Right-of-Way Design/Management
  - Service Characteristics (Frequency, Span of Service, Reliability, etc)
  - Vehicles and Infrastructure



Transit Modes

Local Bus

Regional Bus

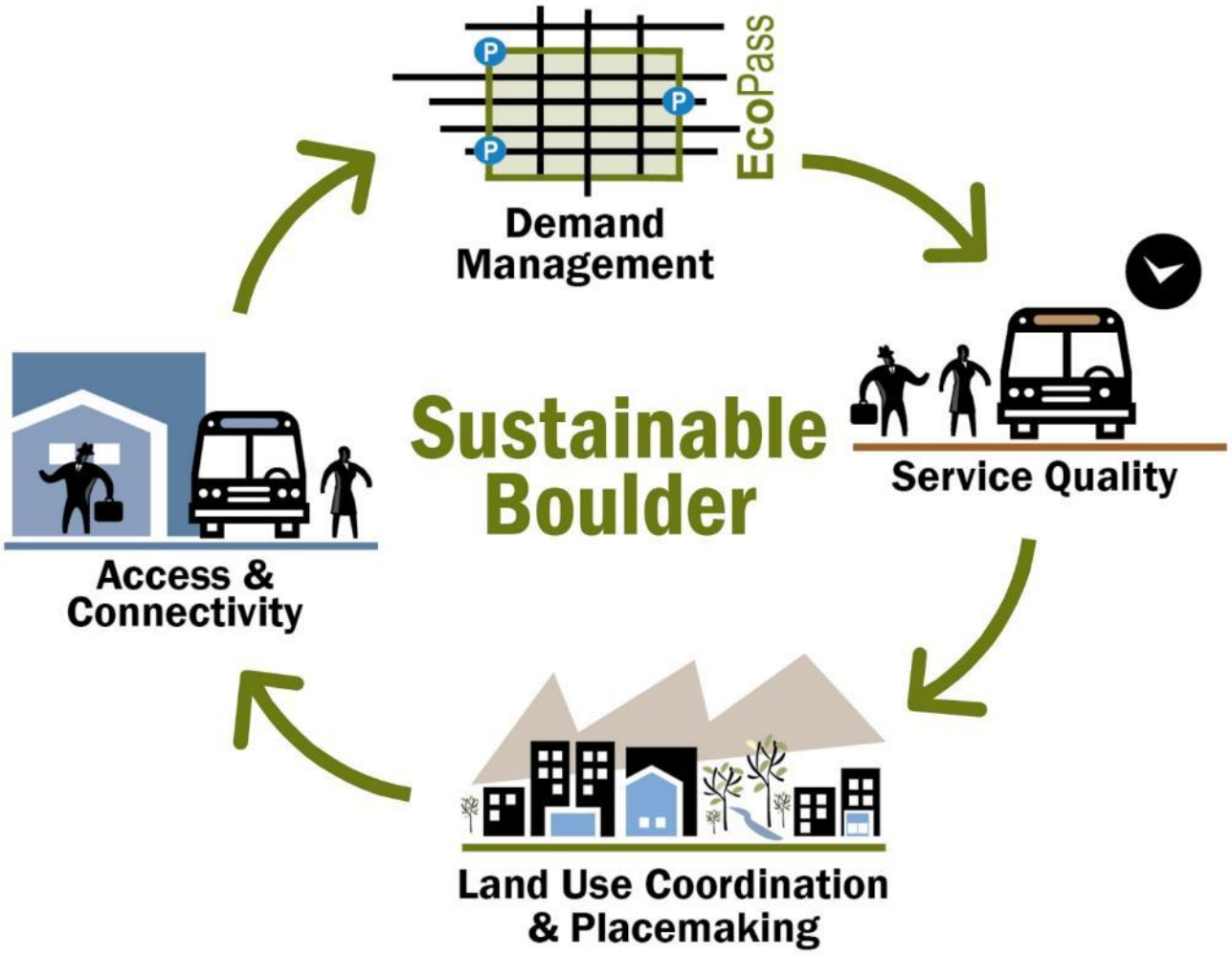
Streetcar

Rapid Bus (BRT Lite)

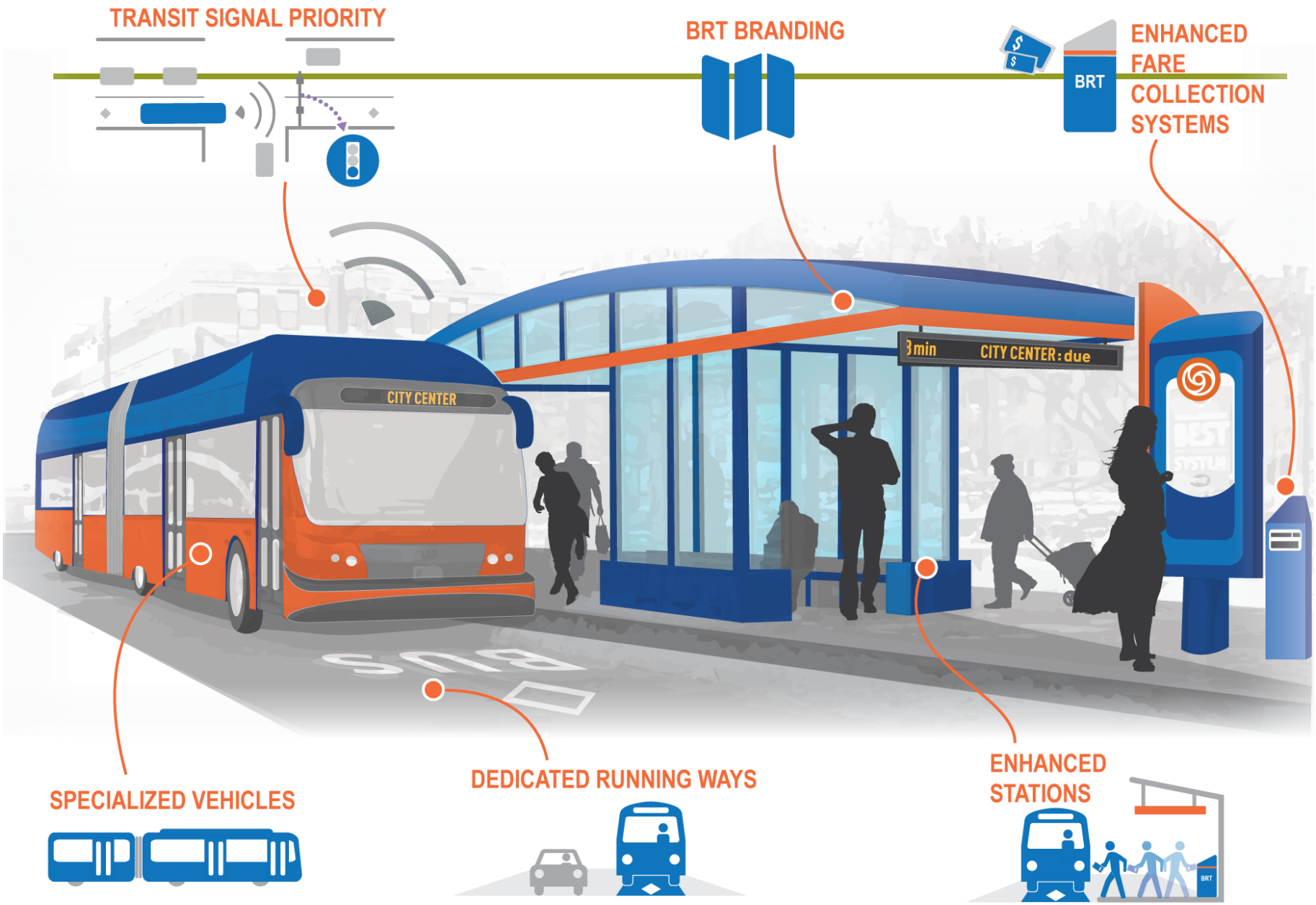
Bus Rapid Transit (BRT Full)

Light Rail

Framework for Evaluating Transit Investments

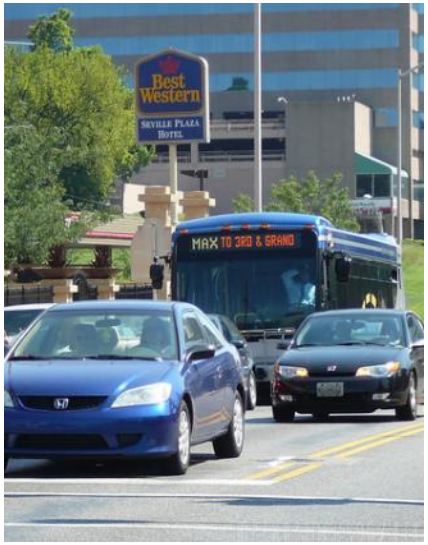


CORRIDOR TRANSIT ELEMENTS – BEST PRACTICES


TRANSIT SIGNAL PRIORITY
BRT BRANDING
BRT
ENHANCED FARE COLLECTION SYSTEMS
CITY CENTER
3 min
CITY CENTER: due
BUS
SPECIALIZED VEHICLES
DEDICATED RUNNING WAYS
ENHANCED STATIONS
BRT

TRANSIT WAY

- Fully exclusive, shared, or hybrid
- Treatments can be peak-only or permanent



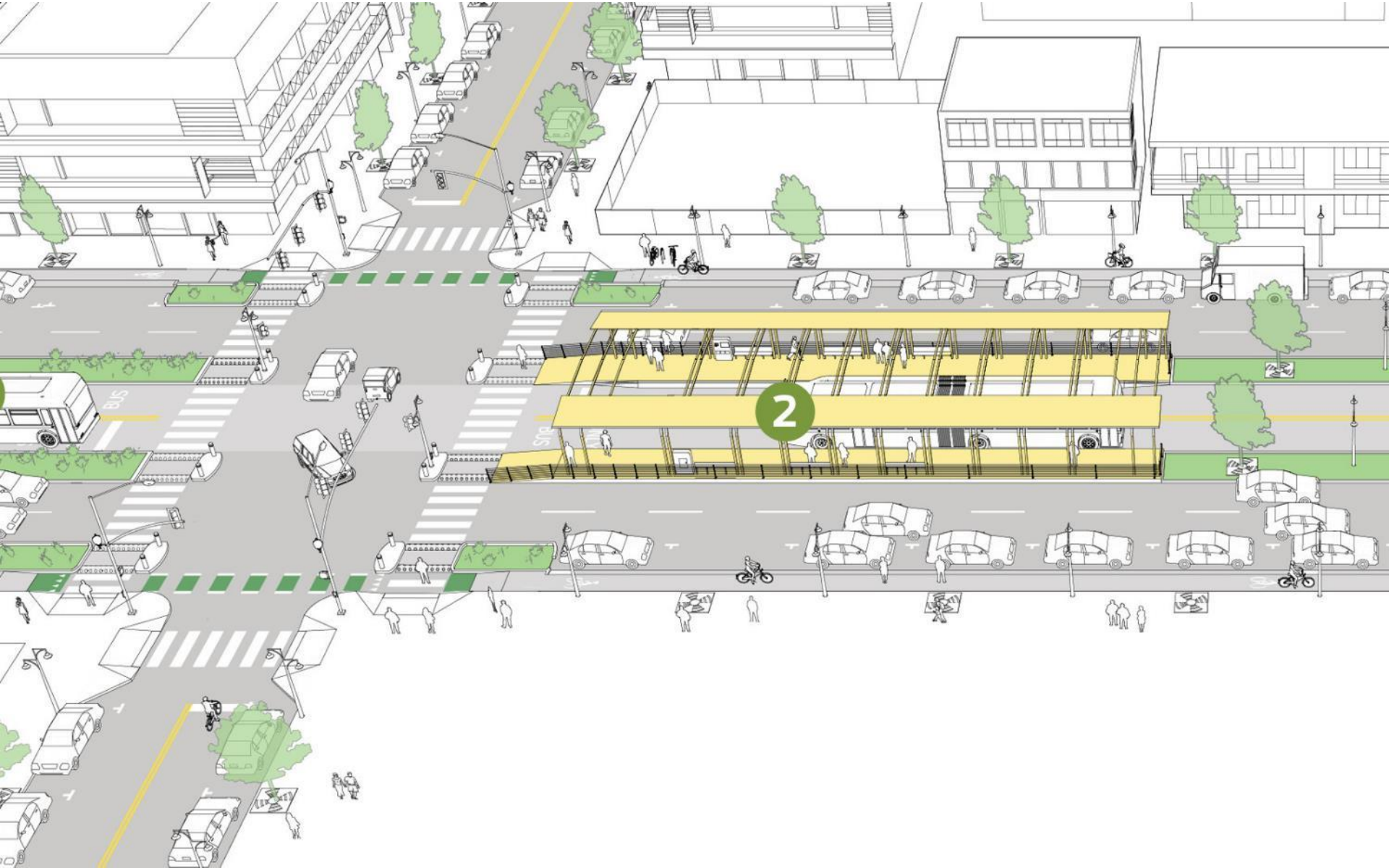
Shared

Hybrid

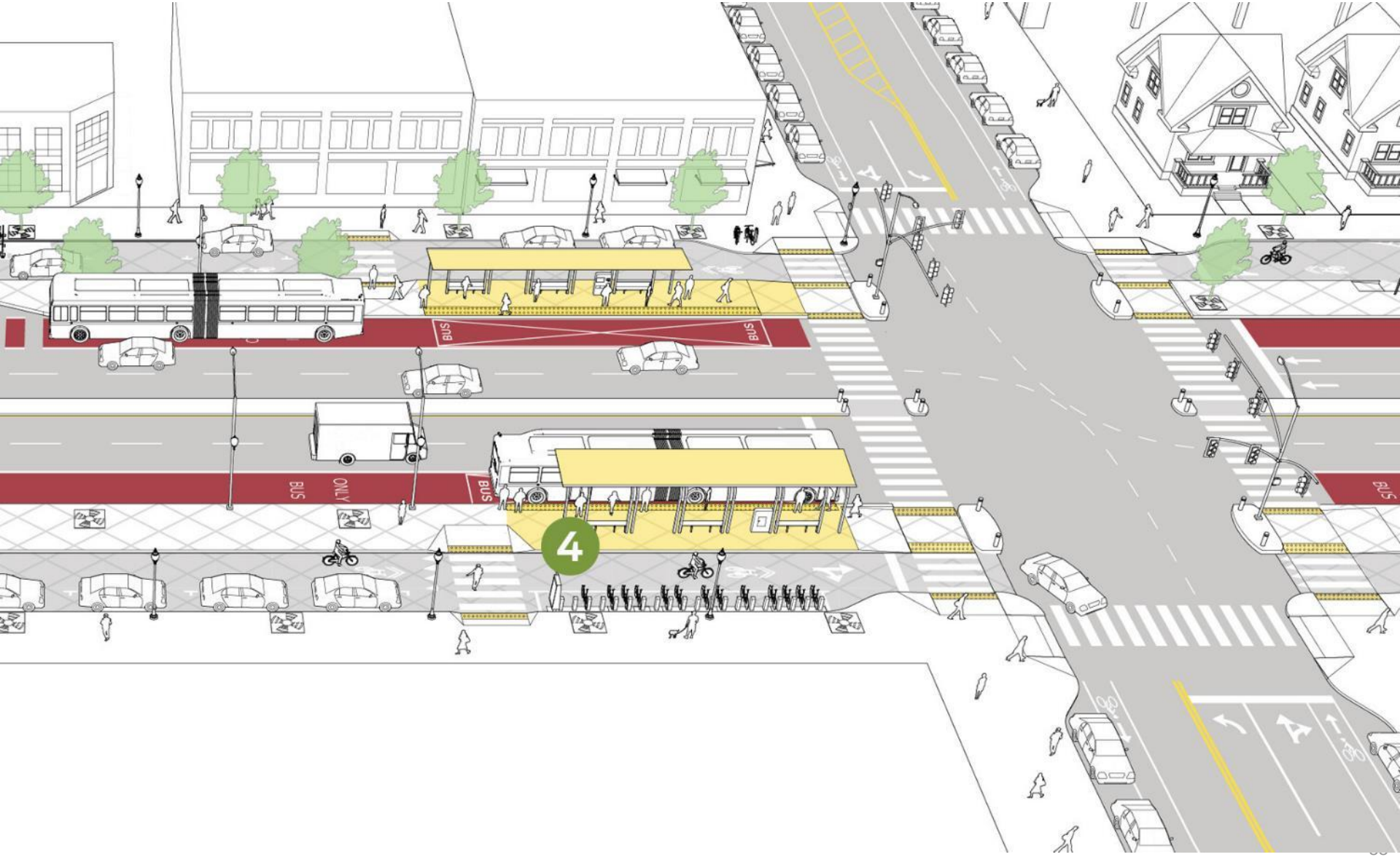
Managed

Exclusive

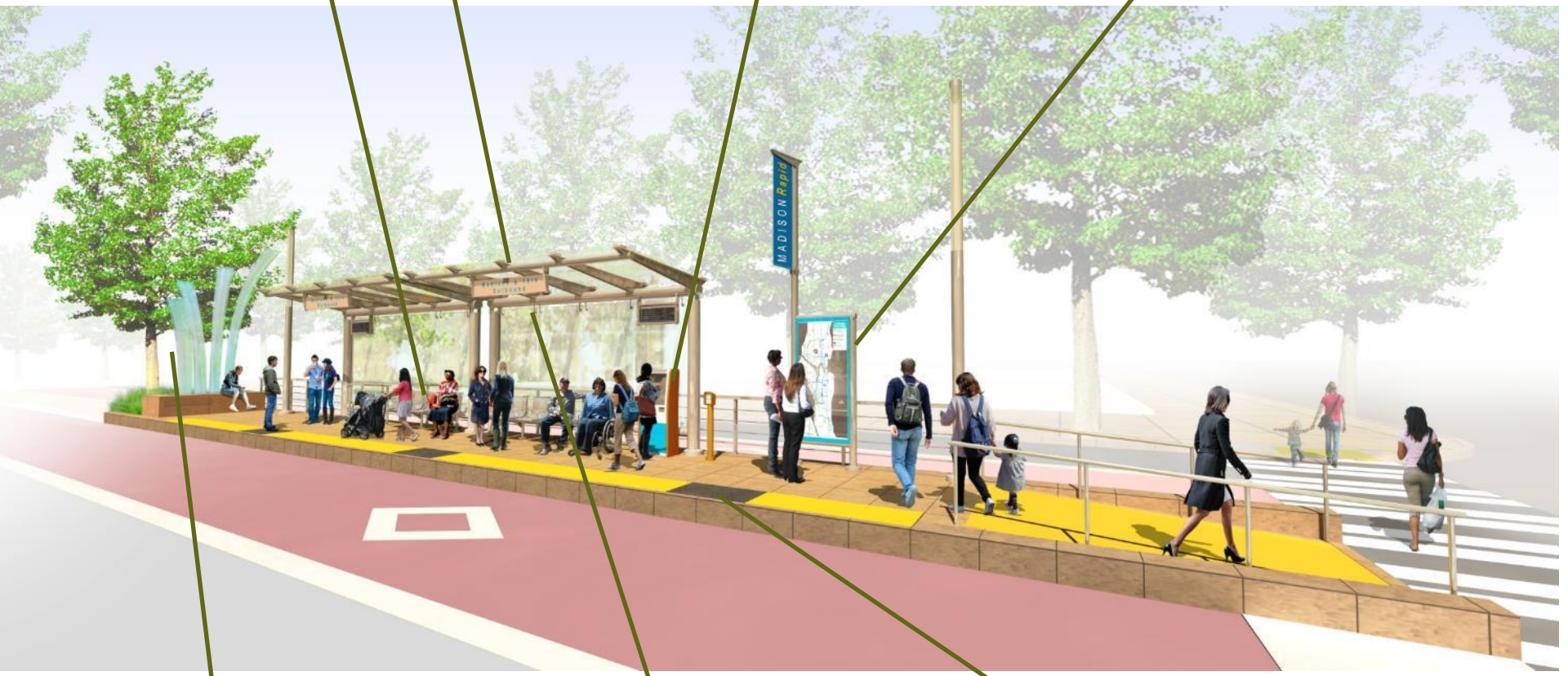
Median Transit Corridor



Transit Boulevard



Elements of a Full-Featured Station



Seating

Real Time Information

Fare collection

Transit Information

Landscaping and Public Art

Shelters

Level Platform Boarding

BRANDING

Line

Network

ACCESS & INTEGRATED MOBILITY

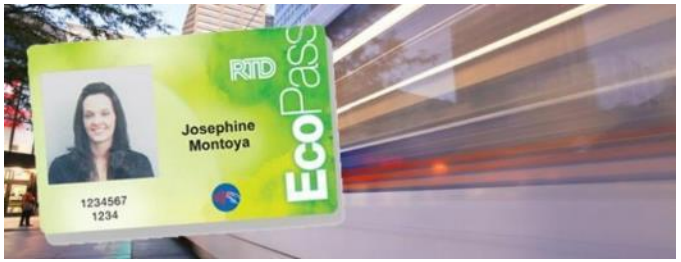
Bikes on Board

- Front loading often disallowed due to dwell time impacts
- Some systems allow bikes on board

Shared Use Mobility

TRANSPORTATION DEMAND MANGEMENT

Strategies that reduce demand for drive alone trips or shift trips to different times of day



MANAGED PARKING

Get the Price Right

New Development Process

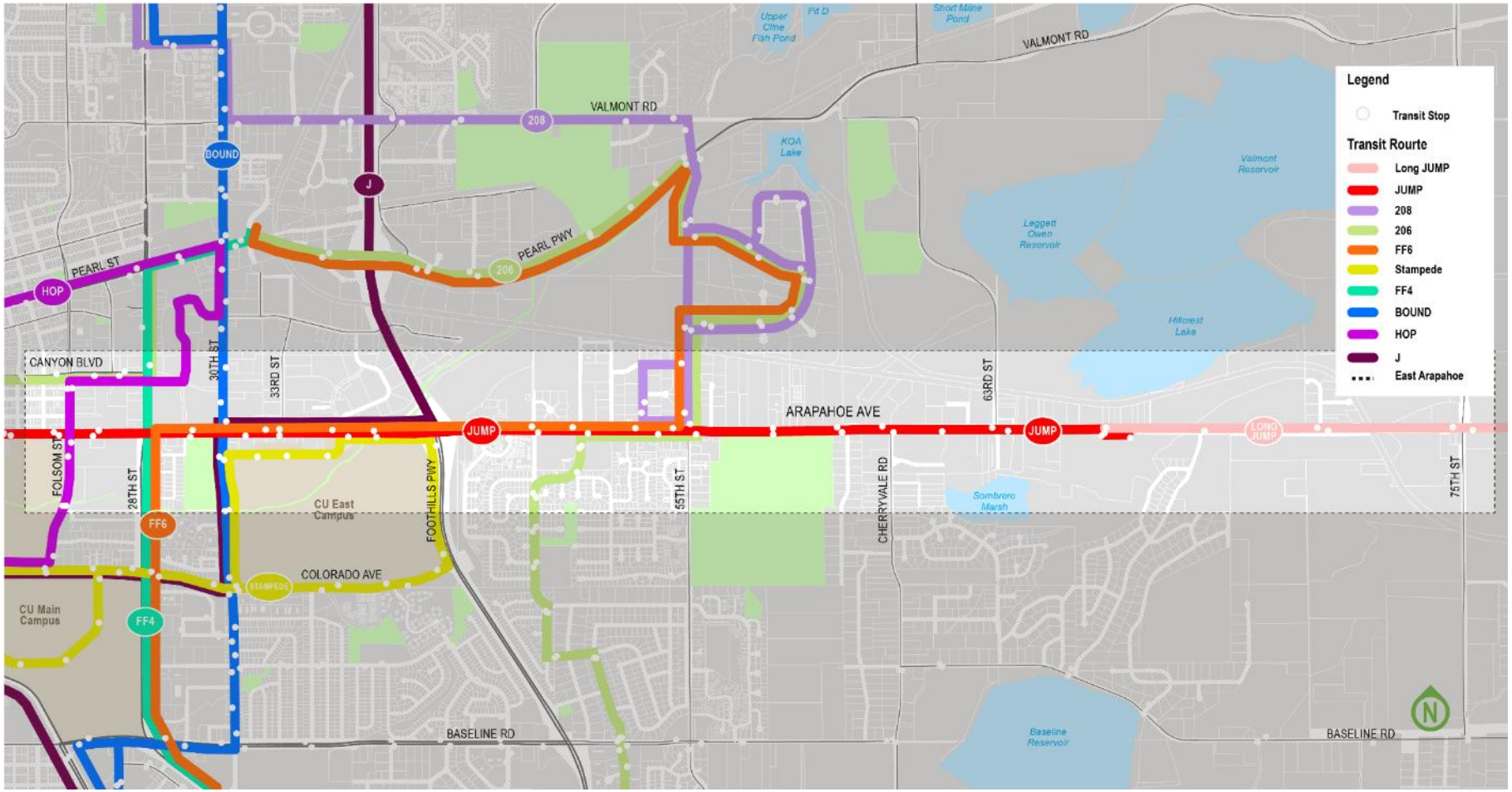
Storage for All Modes

Information & Wayfinding

East Arapahoe Existing Conditions

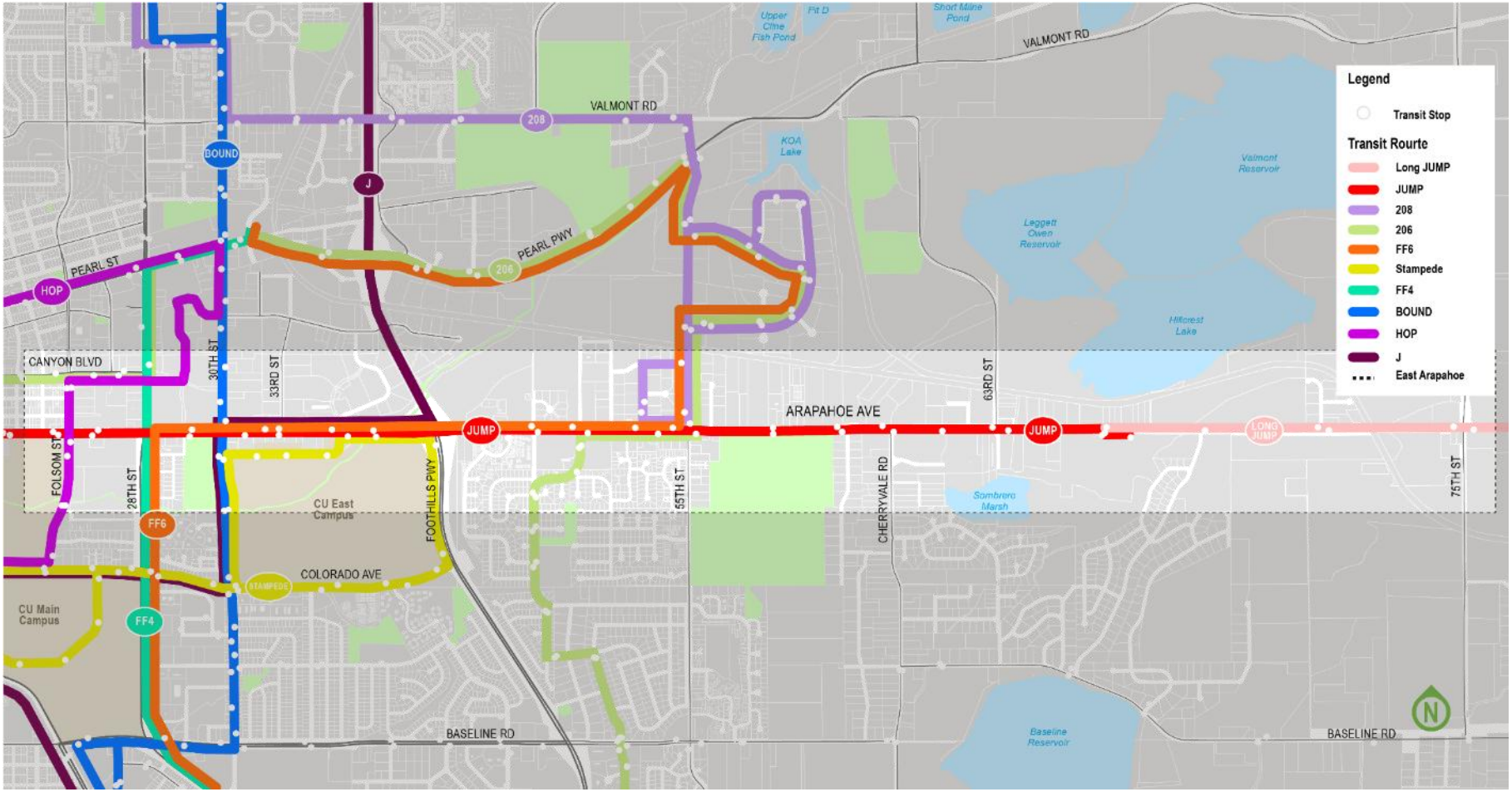
High Quality Transit *along Corridor*

- JUMP provides frequent service with a long span - in Boulder
  - Every 15 min weekdays (10 min during CU session)
  - 5 AM - midnight

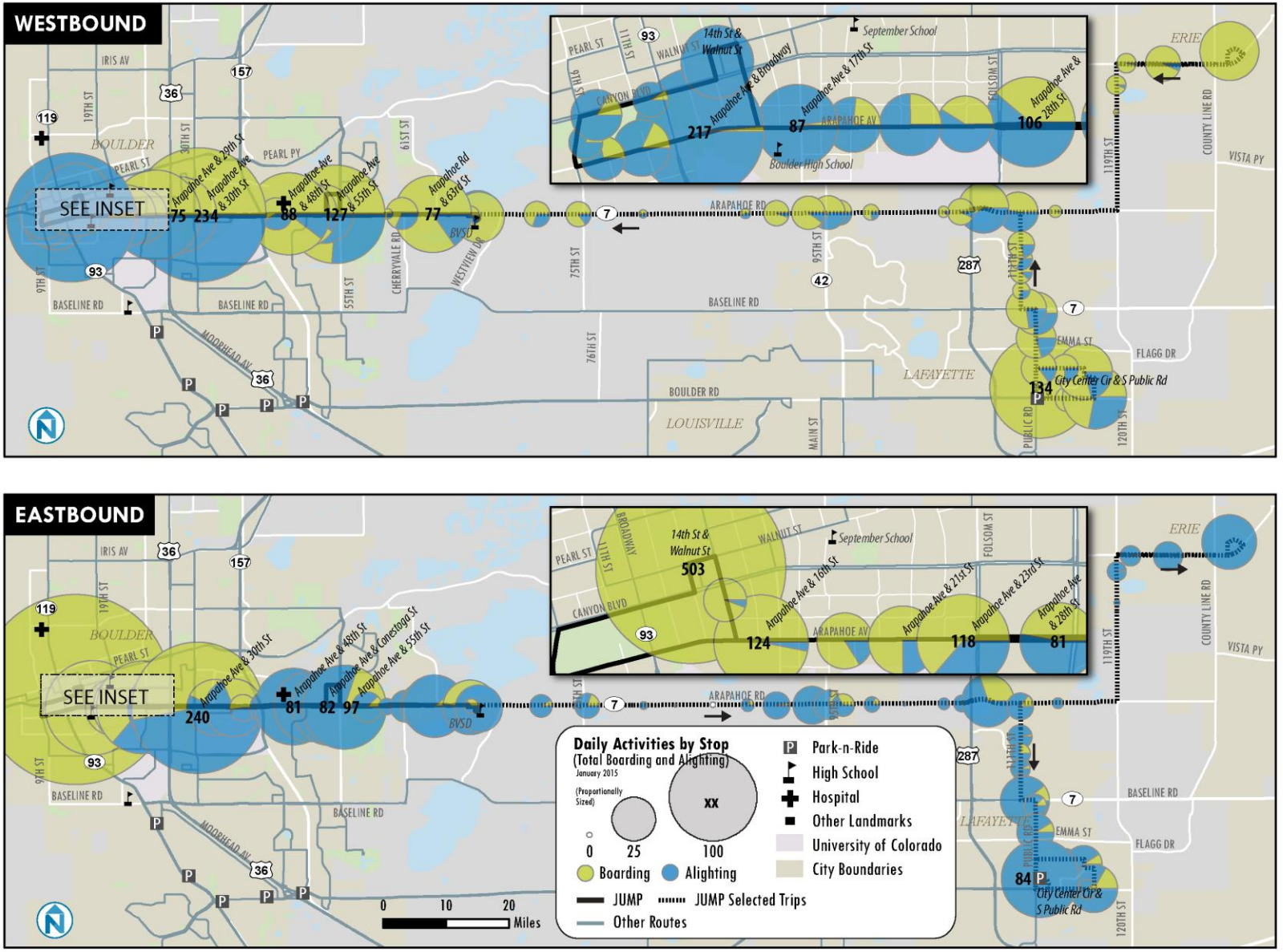


Quality of Transit *Connections is More Limited*

- North-south frequent transit grid breaks down east of 30th
- Regional service is limited outside of peak commute hours

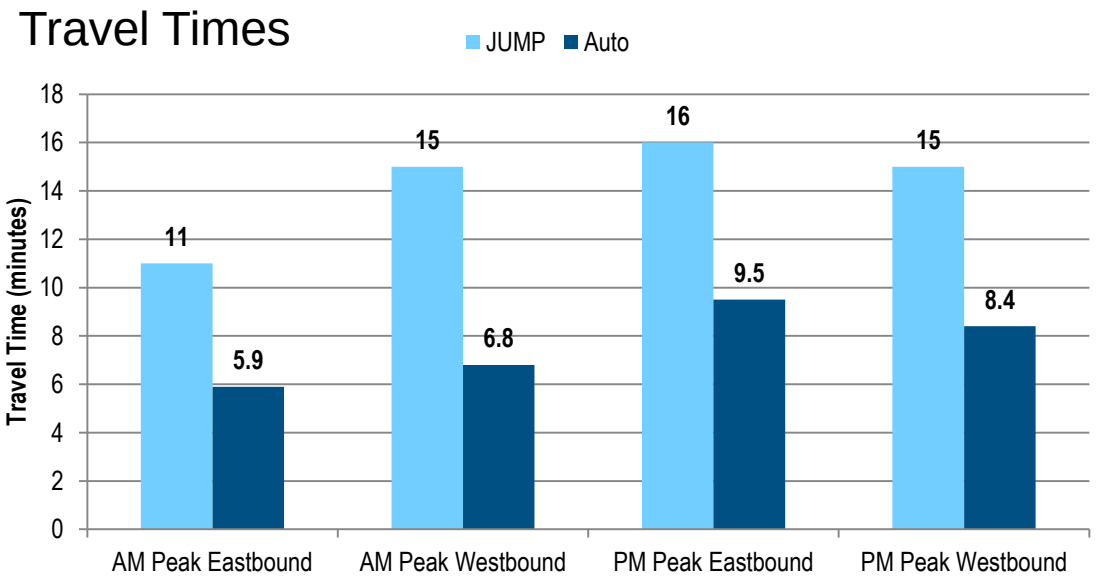


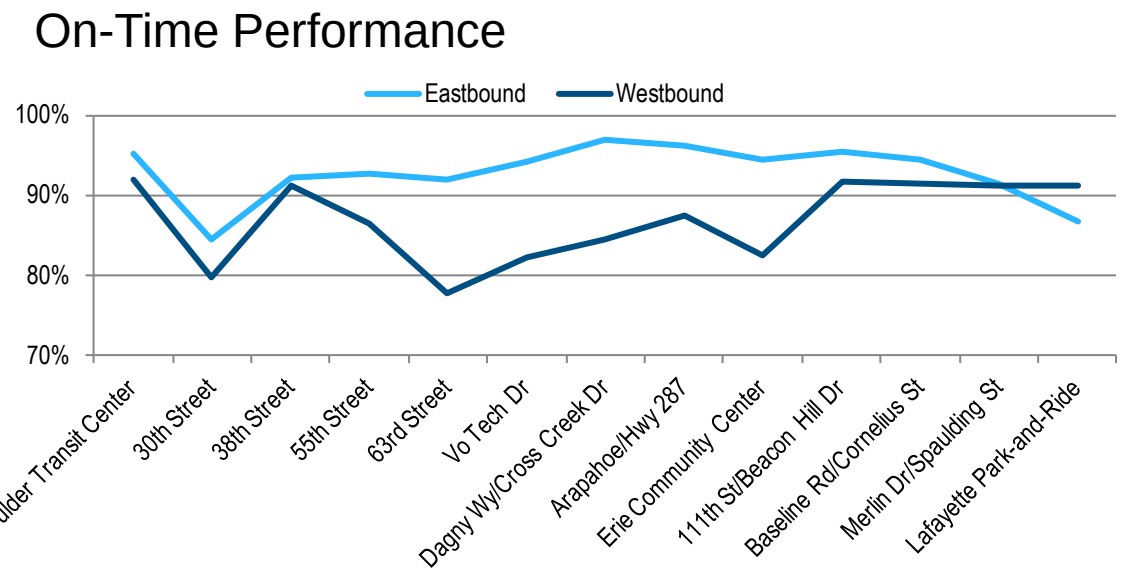
Transit Use In the Corridor



JUMP vs Auto Travel Times, Folsom – 65th

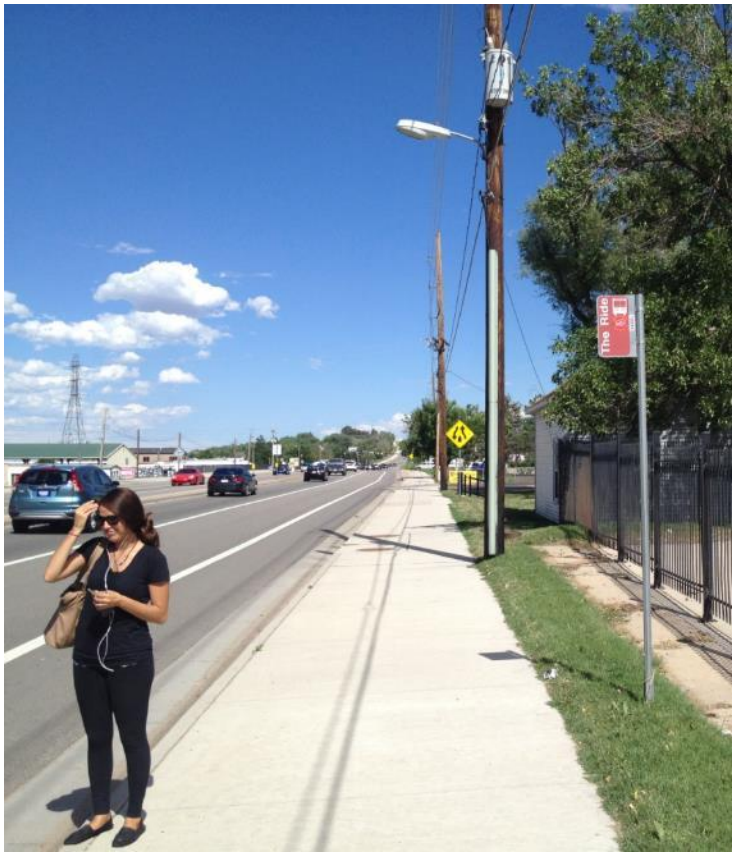
- Takes about twice as long as driving
- Runs mostly on schedule, but less reliable westbound in the afternoon





Level and Condition of Stop Infrastructure

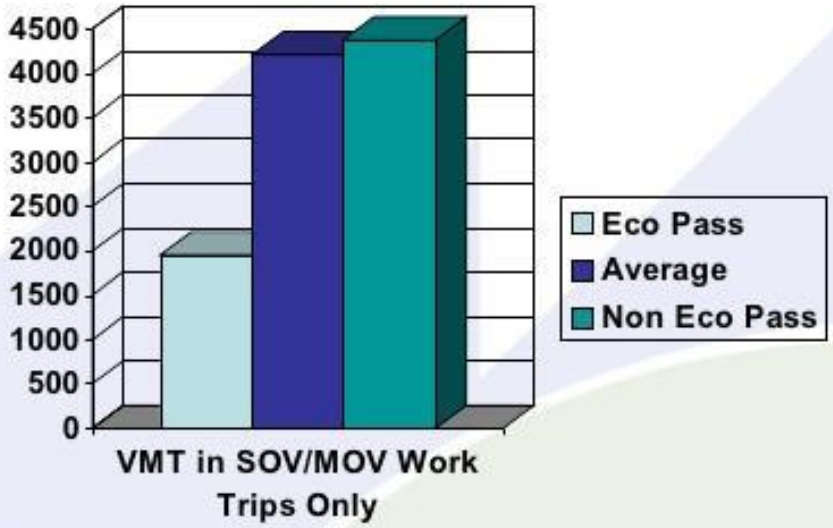
- Completeness and condition (quality) decline east of 29th Street
- > 75% of JUMP stops in Boulder have a concrete bus pad (not always accessible)
- Less than half of stops include a bench or other seating, and 26% contain a shelter

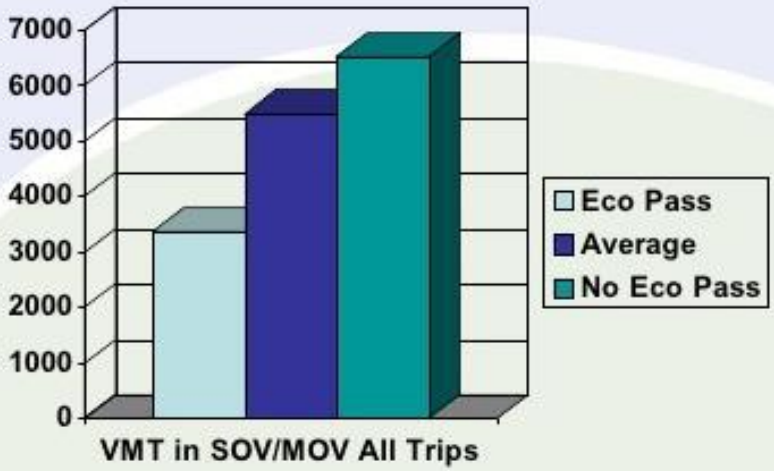


Transportation Demand Management

- 25% of employees have access to EcoPasses
- Bike sharing stations limited on east end of the corridor

> Boulder residents with an Eco Pass drive about **2,600 miles less** per year than residents without and Eco Pass.





> Boulder employees with an Eco Pass drive about **2,300 miles less** per year than employees without an Eco Pass.

SCREENING CRITERIA

Draft Screening Criteria

- **Supportiveness of project purpose and goals**
  - Does the design or management element create an outcome counter to the stated project purpose and goals.

- **Design feasibility**
  - Is there any element of the design that is not technically feasible or has significant adverse environmental impacts?
  - Are national or international peer comparables are available?

- **Cost relative to user benefit**
  - Does the cost per user added to the system or user benefit (ie. safety improvement, cycling comfort, travel time reliability) align with comparable projects that are built and operational?
  - Are national or international peer comparables are available?

- **Safety**
  - Does the element improve or maintain safety for all corridor users including people on bikes and people walking?

Thank You!

East Arapahoe Corridor

Folsom Street – 75th Street

EXTRA SLIDES

East Arapahoe Potential Design Solutions

Potential Design Solutions
(Presented at the Fall 2015 Open House)

- Three general purpose travel lanes per direction
- Two general purpose travel lanes with one lane repurposed for BAT lane (right turns allowed)
- Two general purpose travel lanes per direction with one lane repurposed for a dedicated transit lane
- Three general purpose travel lanes per direction with an additional transit lane

Potential Design Solutions

(Additional options based on input heard at open house, and outreach)

- HOV lanes (such as Santa Fe in SW Denver)

- Managed lanes / Express lanes (such as US 36 or I 25)

Potential Design Solutions

(Additional options based on input heard at open house, and outreach)

- Add general purpose travel lanes at the east end of the corridor
- Reversible general purpose travel lanes
- Grade separated interchange at Foothills / Arapahoe

Potential Design Solutions

(Additional options based on input heard at open house, and outreach)

- Lower speed limits (45 in much of corridor today)
- Better signal timing
- Transit vehicle signal priority
- Traffic circles or roundabouts
- Access control
- Emergency Access

East Arapahoe Corridor

Folsom Street – 75th Street

Evaluating Existing and Projected Conditions

- Sensitivity testing of key variables
  - Lane utilization factors
  - Saturation flow rates
  - Peak hour factors
  - Traffic signal progression